

# T R A F F I C M I T I G A T I O N P L A N

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## **SEBESTA AREA COMPREHENSIVE PLAN AMENDMENT**

College Station, Texas

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FINAL PLAN  
December 15, 2005



## SEBESTA AREA COMPREHENSIVE PLAN AMENDMENT

### Traffic Mitigation Plan

#### BACKGROUND

In October 2005, the City of College Station completed a traffic impact study quantifying the anticipated traffic impacts of a proposed land use change in the area generally surrounded by Emerald Parkway to the north, Woodcreek Drive to the south, State Highway 6 (SH 6) to the west, and several residential subdivisions to the east. These subdivisions include Emerald Forest, Woodcreek, and Foxfire.

Following this study, representatives of the surrounding neighborhoods and the applicant of the proposed land use change worked together to develop a land use plan that is agreeable to each party (attached). It should be noted that the land uses agreed upon were similar and slightly less intense than those used in the traffic impact study. One term of this agreement states that a traffic mitigation plan should be developed to "alleviate the high volume of cut-through traffic that will result on Emerald Parkway, Sandstone Drive, Sebesta Road, Foxfire Drive and Stonebrook Drive."

There are typically two negative impacts that result from cut-through traffic. These include excessive traffic volumes and speeds. Based on the study, it is anticipated that traffic volumes throughout the area will grow as residential and non-residential development occurs within and around the study area. While no one desires for traffic volumes to significantly increase within their neighborhood, increased traffic is a characteristic of a developing community, and some level of growth is acceptable. Similarly, when traffic growth and / or traffic speeds exceed the acceptable level, traffic mitigation is warranted.

To identify when mitigation should take place, a threshold must be established. The College Station Design Guidelines document ranges of acceptable traffic for different types of thoroughfares. Traffic volumes on thoroughfares throughout the city are consistently monitored based on these guidelines. If actual traffic volumes exceed the set maximum, mitigation should be implemented.

#### MITIGATION PLAN

The roadways that are of particular concern are shown in the table below with associated thoroughfare type, anticipated volume based on the traffic study, and the acceptable traffic volume range as documented in the College Station Design Guidelines.

<b>Thoroughfare Volume Summary</b> Sebesta Road Comprehensive Plan Traffic Mitigation Plan			
Street Name	Thoroughfare Type	Anticipated Volume (vehicles per day)	Acceptable Volume Range (vehicles per day)
Emerald Parkway	Minor Collector	7,400 vpd	1,000 – 5,000 vpd
Sandstone Drive	Minor Collector	3,900 vpd	1,000 – 5,000 vpd
Sebesta Road	Minor Collector	5,900 vpd	1,000 – 5,000 vpd
Foxfire Drive	Minor Collector	3,300 vpd	1,000 – 5,000 vpd
Stonebrook Drive	Minor Collector	4,800 vpd	1,000 – 5,000 vpd

## **SEBESTA AREA COMPREHENSIVE PLAN AMENDMENT**

### **Traffic Mitigation Plan**

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#### **Emerald Parkway and Sebesta Road**

As shown in the table above, there are two cases where the traffic volumes exceed the acceptable volume range, namely Emerald Parkway and Sebesta Road. While Emerald Parkway is expected to carry up to 7,400 vehicles per day, it should be noted that this thoroughfare was built to a major collector standard with an acceptable volume of 10,000 vehicles per day. Furthermore, once the AMS Road is constructed, this excessive volume will be limited to the portion of the roadway between SH 6 and AMS Road. The anticipated traffic on Sebesta Road exceeds the acceptable volume range between SH 6 and the driveway into the proposed retail development to the south of Sebesta Road. Volume on this section of Sebesta Road can be handled without impact to the surrounding neighborhoods.

#### **Sandstone Drive, Foxfire Drive, and Stonebrook Drive**

Based on discussions with neighborhood representatives, the primary concern for impacts to the neighborhoods are associated with increased traffic on those thoroughfares that penetrate the neighborhoods, namely Sandstone Drive, Foxfire Drive, and Stonebrook Drive. While it is not anticipated that traffic volumes will exceed the acceptable volume range on these roadways, parameters should be established to trigger mitigation if traffic volumes are higher than expected. To be proactive, city staff recommends if and when traffic volumes on any of these roadways reach 4,000 vehicles per day, the impacted area will be included as a candidate project for College Station's Neighborhood Traffic Calming Program (attached). Based on the program policy, if it is determined that the need for mitigation in this area exceeds that of other candidate project areas, a traffic calming plan will be developed by a team composed of neighborhood representatives and city staff. If the plan is approved by a vote of the neighborhood, as specified in the neighborhood traffic calming policy, it will be implemented.

The traffic calming measures used in the plan will be based on the type of impact that is being mitigated. Measures that can be used for traffic calming are included in the Neighborhood Traffic Calming Toolbox (an appendix to the Neighborhood Traffic Calming Program). It should be noted that roadway closures and partial closures are not recommended for use on thoroughfares unless traffic volumes exceed the documented acceptable traffic volumes, and traffic calming measures within the project area and improvements to alternative routes outside of the area have proven ineffective to mitigate the negative impacts. Even in these cases, the neighborhood must approve the measures, as documented in the neighborhood traffic calming policy.

The most favorable and permanent mitigation plan for traffic on Sandstone Drive will be the construction of AMS Road, providing a more appropriate route for traffic desiring to access locations south of Sebesta Road from the north. The construction of this roadway should be done independent of and prior to the need for mitigation on Sandstone Drive. The timing of the construction of this roadway will be based on council's transportation project priorities and available funding.

## **SEBESTA AREA COMPREHENSIVE PLAN AMENDMENT**

### **Traffic Mitigation Plan**

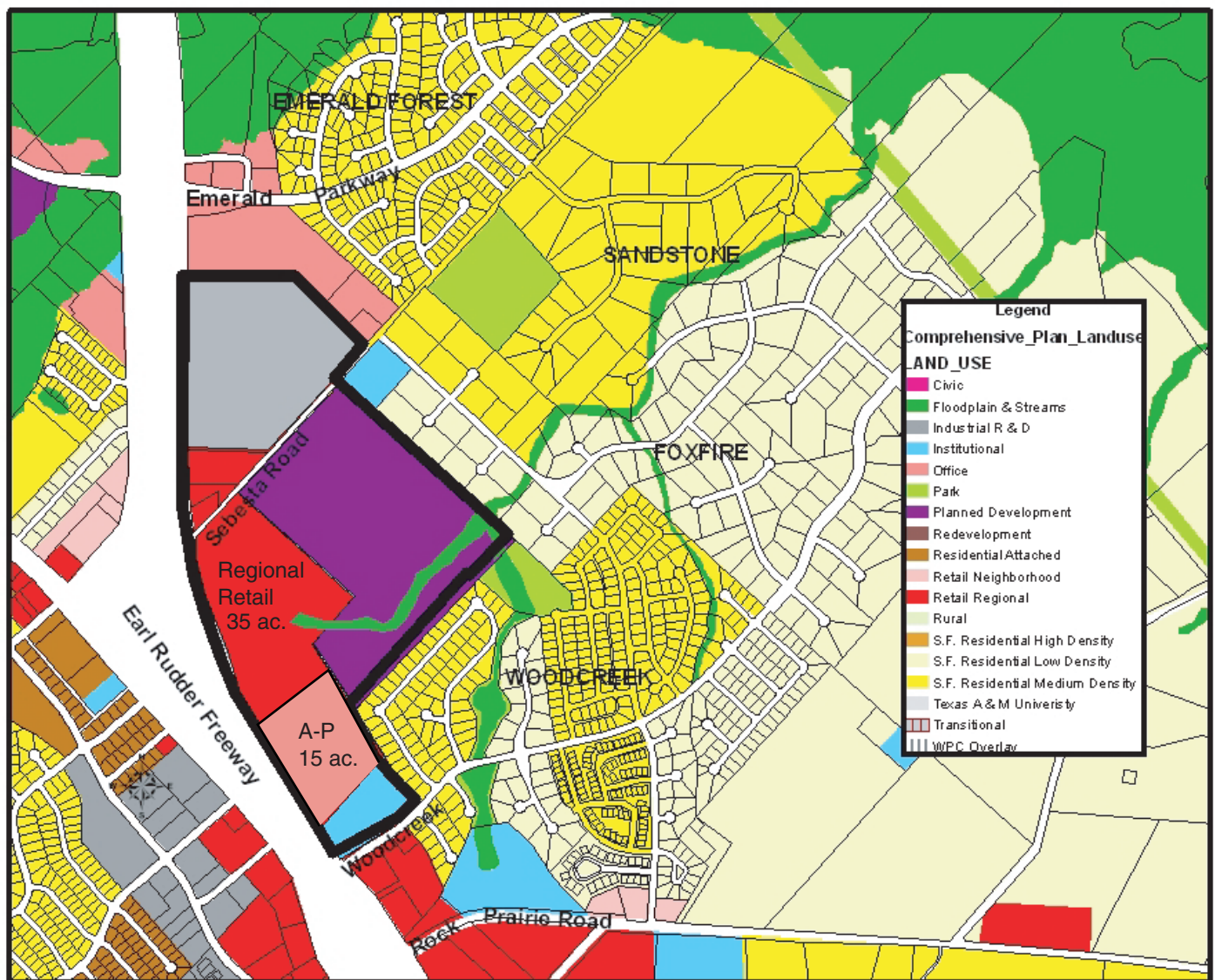
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#### **Bike and Pedestrian Accommodations**

To provide for a safe place to walk and bike along Foxfire Drive, a sidewalk must be constructed along the roadway connecting the sidewalks along Stonebrook Drive to the sidewalks along Sebesta Road. Due to the rural cross section of the roadway, this sidewalk should be placed outside of the existing ditch. This project will be prioritized with existing sidewalk projects as soon as the property owners along Foxfire Drive provide a petition to the City of College Station requesting that this sidewalk be built.

Emerald Parkway, Sebesta Road, Foxfire Drive, Stonebrook Drive, and Woodcreek Drive are shown on the Bikeway and Pedestrian Master Plan as existing or proposed bike lanes. Streets with proposed bike lanes can be striped and signed when needed based on the desires of the neighborhood.

# ATTACHMENTS



Comprehensive Plan amendment to change to Regional Retail and Administrative Professional uses on the land use plan. Future rezoning of the land designated as Regional Retail is contingent upon the creation of a new East Bypass Zoning District that is consistent with the uses specified in the East Bypass Small Area Action Plan or by use of a PDD or its facsimile. In addition, future development of the land designated as Regional Retail is incumbent on the concomitant implementation of traffic mitigation measures to alleviate the high volume of cut-through traffic that will result on Emerald Parkway, Sandstone Dr., Sebesta Rd., Foxfire Dr. and Stonbrook Dr.

At the same time A-P Office zoning will be requested for the property abutting the Lutheran Church up to Technology Dr.

# NEIGHBORHOOD TRAFFIC CALMING

## I. Introduction

College Station City Council vision statement #8 is directly related to the issue of traffic calming in neighborhoods. *“As a result of our efforts, citizens will live in well-planned neighborhoods suited to community interests and lifestyles.”*

Where a person lives is a very important part of how a person feels about their community. The noise, safety hazards, vehicular speeds, vehicular volumes, and existence of sidewalks all contribute to a neighborhood's integrity. As speeding and vehicular volume increases, walking to the neighborhood store or even across the street to a neighbor's house can be an uncomfortable event.

The City of College Station recognizes the usefulness of physical measures to effectively solve neighborhood traffic problems. The traffic calming guidelines outlined in this report provide a basis for establishing the selection and installation criteria.

## II. Objectives

1. To promote safe and pleasant conditions for residents, pedestrians, bicyclists, and motorists on local neighborhood and residential collector streets.
2. To reduce impacts of traffic and speed on local neighborhood and residential streets.
3. To preserve and enhance pedestrian and bicycle travel within neighborhoods
4. To achieve efficient and safe movement of traffic within neighborhoods (including emergency response vehicles) consistent with the intended function of the residential streets.
5. To maintain acceptable levels of service on the city's arterial streets so as to avoid intrusion/diversion onto local neighborhood streets.

## III. Policies

The following policies are established as part of the Neighborhood Traffic Calming Program for neighborhood streets:

1. Through traffic should use major thoroughfares as shown on the City of College Station's Thoroughfare and Transportation Improvement Plan.
2. Emergency vehicle access should be preserved.
3. Neighborhood Traffic calming projects should encourage and enhance pedestrian and bicycle access to neighborhood destinations.
4. Traffic calming improvements should be limited to neighborhood streets. This includes residential (local) and minor collector streets.
5. Reasonable automobile access should be maintained.
6. Traffic calming measures that result in diversion of traffic to other residential streets should be discouraged. However, a small amount of traffic diverted to other residential streets may be acceptable. The acceptable amount of traffic diverted to other residential streets shall be determined on a case by case basis.
7. Traffic calming measures should be planned and designed in keeping with sound engineering and planning practices.

## IV. Selection of Project Areas

If funding for the program is available, one traffic calming project is selected each fiscal year. The exception to this rule occurs when the size of a project area is so big that its selection means that the project spans over two fiscal years or when the selected project is so small that resources for an additional project exist during the fiscal year. Areas that have been studied in previous years will not be eligible for re-evaluation for five years.

Traffic calls and/or complaints along with requests for traffic calming measures to address speeding and cut-through traffic problems on residential streets will be maintained in a database and on a city map. City staff selects three residential streets that appear to exhibit the highest speeding, volumes and/or cut-through traffic, problem. Each year, traffic speed and volume data will be collected on the three neighborhood streets / areas having the highest amount of calls, complaints and requests. These three streets / areas then ranked using the speed and volume data to determine a 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> project priority order. The street / area ranked 1<sup>st</sup> will be selected as the annual project. The Neighborhood Traffic Calming Program Prioritization Criteria can be seen in Appendix A.

In order to ensure that a particular street or area is considered for neighborhood traffic calming, a citizen or neighborhood association must call or write to the City of College Station to request the problem street(s). Requested streets will be included in the City's traffic calming request list. All requests received by August 1<sup>st</sup> are considered for the following fiscal year, beginning October 1. This August deadline provides adequate time for the City to collect speed and volume data and rank each of the project areas in time to begin the study process shortly after the start of the new fiscal year.

## **V. Community Contact**

After the project location has been selected, City staff sends a letter to each business, property owner, and resident in the project area. In addition, letters are also sent to the president of the neighborhood association(s) within the project area. The letter describes the process, goals, timeline, and requirements and includes an invitation to attend a general meeting introducing the program. Also included in the letter is a survey for residents, property owners and businesses to fill in describing various traffic related problems in the project area. This survey can be mailed to the City or brought to the general meeting.

At this initial meeting, a working group of volunteers is established. These persons agree to develop the traffic calming plan with the assistance of City Staff. See Section VI for guidelines of the working group.

The City of College Station staff notifies the College Station Independent School District, Brazos Transit, TAMU Bus operations, Fire Department, Police Department utility companies and Solid Waste Services. A request for their routes in these project areas is made. They are invited to attend the meeting where the working group identifies possible measures for problem street sections in order to express their concerns.

## **VI. Working Group**

The working group is comprised of residents living within the project area and an officer of the neighborhood association(s). Non-resident property owners and representatives of area businesses are also encouraged to participate in the working group. Working group members should represent the project street as well as other nearby streets in the neighborhood that could significantly be impacted by the project. Not more than two members should reside on any one street.

The maximum number of participants in the working group is 15 persons. It is expected that some of the members may not be able to attend every meeting. Minimum attendance in order to continue with the meeting is 50 percent of the working group, or 5 persons (whichever is greater). If the minimum attendance does not exist, the meeting is rescheduled. Every attempt is made to ensure that the meetings are scheduled for dates and times which work the best for as many members as possible.

At the first meeting, a chairperson is elected to serve as the leader of the working group. This person's role is to ensure that the members stay focused on the task, to be the spokesperson of the group, and to provide assistance to City staff in identifying meeting locations or other tasks.

Also occurring at this first meeting, ground rules are established for all of the meetings. The list of ground rules may include items such as methods for communicating with each other and the project area residents, meeting start and end times, and any other rule that the group wishes to establish. Although future meetings could include the addition of new rules, this list will make up the basis for the future meetings. As such, it should be posted at every working group meeting.

Each of the responsibilities for members of the working group is intended to encourage input and involvement from the participants. By providing feedback on the development of the traffic calming plan, the working group members take more ownership of the finished product.



It should be understood that the development of the traffic calming plan typically requires six meetings each lasting no more than two hours in length.

## **VII. Problem Identification**

After the initial general meeting and before the first working group meeting, City staff summarizes the results of the survey and, if necessary, prepares a list of the possible traffic problem locations in the project area. Following the business items at the first meeting of the working group, the members review these traffic problems and brainstorm any additional locations needing attention. If necessary, the group prioritizes the street sections and intersections in the project area having the worst traffic problems.

City staff takes the list from this meeting and, if necessary, collect traffic data to confirm problems mentioned.

## **VIII. Data Collection**

Data is collected in spring and fall months during regular school days. They consist of vehicular speed, traffic volume, pedestrian activity, and/or any other observation to confirm the traffic problems stated in the survey or at the first meeting. The length of the data collection depends on the type of data that is collected.

## **IX. Evaluation of the Traffic Data**

City staff evaluates the traffic data to determine levels of traffic volume, vehicular speed, pedestrian activity, and other observations. If specific problems are mentioned as a priority in the survey or at the first meeting, staff assesses the problem. For example, if speeding is said to be a problem on Street A, then City staff collects the speed data to determine the speed on Street A.

The results found in these data collection efforts are summarized and presented by the City staff at the second working group meeting. Members have the opportunity to take the information with them to review.

## **X. Menu of Traffic Calming Measures**

There are many measures currently being used to address neighborhood traffic problems. Some are used to address vehicular speeding and others to address cut-through traffic problems. Some measures may have an impact on both the vehicular speed and volume. Still others are intended to improve the safety of or give priority to non-motorized modes of transportation. See Appendix B for diagrams, advantages, and disadvantages of some of the traffic calming measures.

The City recognizes the desire to have measures that are aesthetically pleasing to the residents who live there. Traffic calming measures that include a raised curb allow for vegetation within the measure. In fact, the use of greenery to provide vertical sight restrictions is encouraged. City staff determines whether a proposed measure will provide any traffic enhancement and inform the working group of their findings. Although measures that involve the construction of a raised curb and landscaping are seen as more attractive than the vertical undulations like the speed humps, they are also more expensive and have greater impact to the adjacent properties such as the removal of on-street parking. Limited funds may restrict the number of measures including raised curb and gutter.

Every attempt is made to ensure that only the necessary signs and markings are installed. Excessive clutter is not the intent, rather it is to adequately warn, guide and protect the users of the roadway.

## **XI. Traffic Calming Plan Development**

After reviewing the traffic data and the menu of measures available, the working group is responsible for brainstorming possible solutions to address the given traffic problems. City staff is present to guide this session. In addition to the Transportation Analyst, representatives from the College Station Fire Department, and any other relevant agencies are encouraged to attend. If routes in the project area are critical for their services, then the working group is advised of these streets at this meeting. Regular users of the roadway are considered when developing the type and design of the measures.

After some consensus is achieved on which measures the working group desires and the specific locations of the measures, City staff then analyzes the proposal. Each measure is evaluated for its likelihood of addressing the given problem. In addition, roadway alignment, driveway spacing, street width, and other factors are considered in order to determine whether the measure is possible.

The evaluation may result in changing the proposed measure. The technical expertise of the Transportation Analyst will govern the selection and, location of the proposed measures. For example, steep grades may preclude the installation of a measure. Staff identifies these barriers and informs the working group. After the evaluation is complete, the City develops a map showing the proposed measures and presents it to the working group. This plan is discussed, modified, if necessary, and voted on by the working group. If modifications are requested, an additional meeting may be required to allow time for the staff evaluation of the proposed measures and/or location of measures.

## **XII. Plan Approval Process**

After the working group approves the traffic calming plan, the next step involves a vote of all residents, businesses and property owners in the project area. An open house meeting is held to present the plan to all interested persons. The invitation to attend this open house meeting is included in a letter mailed by the City. This letter also contains details of the traffic calming plan, maps showing where the measures are proposed, verbal descriptions of each measure, and a stamped, self-addressed ballot. These letters are mailed to every resident, property owner, and business in the project area.

Each household or business is allowed one vote. **At least 2/3s of the ballots received have to be in favor of implementing the plan.** There is no minimum number of ballots that have to be returned.

The letter is mailed at least 10 days prior to the open house meeting and the deadline for receiving the ballots is about one week following the open house meeting. This allows voters the opportunity to read through the material, return the ballot or attend the open house meeting and still have time to fill out the ballot before the deadline.

The traffic calming plan is voted on as a whole. Because the plan is a system of integrated calming measures, individual streets or measures can not be taken out of the proposal as part of the vote. If one measure or one street were removed from the plan, the comprehensive nature of the plan would be lost, and residents on that street may experience higher traffic speeds and/or increased traffic volumes. The vote is either yes or no. Comments are welcomed, but do not change the complete package. This is the only opportunity to vote on the traffic calming plan so every effort must be made in the planning stages to ensure that it is correct and complete.

If the 2/3s approval is obtained, then City staff completes the design of the measures for the construction. If the 2/3s approval is not obtained, then the City does not implement the plan and the project area is not be eligible for evaluation during the next five years.

## **XIII. Measure Location**

There are advantages and disadvantages of each traffic calming measure. The advantages could include reduced traffic speed or volume, increased safety, and beautification of the streets. The disadvantages include possible inconvenience to residents driving in the neighborhood, parking restrictions, unattractive measures, and increased noise for residents adjacent to the measure. Because many residents may object to having a measure immediately adjacent to their property, it is necessary to establish the requirements for the consideration of shifting a proposed measure. In some communities, no consideration is given to the resident when objections about the placement of the measure arise. Others give some leeway to residents if nearby locations are acceptable and adjacent residents approve. This decision is controversial and can lead to the downfall of the entire project.

If an agency gives residents veto power, then the plan can dissolve as everyone wants something to address the problems, but no one is willing to allow the placement adjacent to their property. A piecemeal plan soon develops and the comprehensive nature is then mute.

Therefore, the responsibility to make this decision on whether or not to give residents the ability to veto a measure location adjacent to their property will rest with the working, group. This decision should be made prior to the development of the plan.

If deemed necessary, the City will modify the traffic calming plan to address problems discovered during the temporary or permanent installation period. In addition, if safety problems surface following the permanent installation, the City will take the appropriate action to address the problem.

#### **XIV. Landscaping**

Vegetation is chosen which requires minimal attention, such as xeroscape. Measures that include raised curb could contain 1-3 trees, low lying shrubs, and ground cover, depending on the size of the measure. The neighborhood association will have the responsibility of maintaining the landscaping. Adjacent residents could in their routine lawn maintenance, water or trim the vegetation when the need arises.

#### **XIII. Impact to Adjacent Streets**

In order to ensure that the traffic calming plan does not merely shift traffic to other neighborhood streets within the project area, traffic volume data is collected on possible diversion routes before and after implementing the approved plan. If residential streets experience an increase greater than 300 vehicles per day, the City will attempt to address the volume increase. Example actions to mitigate the volume increase include the modification of the measure(s) that created the shift or the installation of additional measures on the impacted street.

#### **XIV. Conclusion**

This Neighborhood Traffic Calming Program offers effective solutions to address residential traffic problems. The comprehensive nature of the program allows for mitigation of potential impacts to all streets within the entire project area. It is a program in which all residents, businesses and property owners are allowed and encouraged to participate in the process. With the technical assistance from the City of College Station, traffic calming plans can be developed and approved by those most affected.

As the population in the City of College Station continues to grow, city streets are experiencing increased traffic pressure. Residents, parents, school administrators, and neighborhood associations have avenues to consider when trying to address traffic problems. Evaluating streets in an entire project area can be a worthwhile activity to foster a sense of community and develop solutions that not only address traffic problems, but also offer attractive areas of landscaping and textured pavement. These modifications can, in turn, result in increased safety, property values, and improve the overall quality of life.

## APPENDIX A

### NEIGHBORHOOD TRAFFIC CALMING PRIORITY POINT RANKING

**STREET:** \_\_\_\_\_

**FROM** \_\_\_\_\_ **TO** \_\_\_\_\_

**STAFF NAME** \_\_\_\_\_ **DATE** \_\_\_\_\_

CATEGORY	POINTS
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**1. Traffic volume (50 points max)**

- Greater of ADT/60 or PHV/60

\_\_\_\_\_

**2. Speed (50 points max)**

- % of vehicles over posted speed limit/2

\_\_\_\_\_

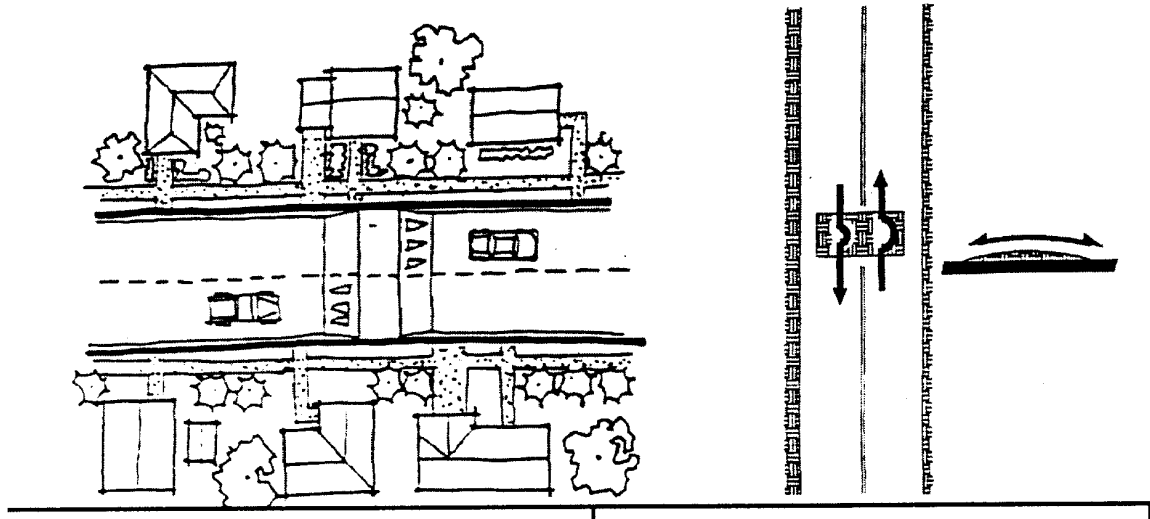
**TOTAL POINTS**

\_\_\_\_\_

## APPENDIX B

### NEIGHBORHOOD TRAFFIC CALMING TOOLBOX

#### SPEED HUMP



#### DESCRIPTION:

Speed humps are raised sections of pavement across the travel way with curved transitions. These measures are 22 feet in length and approximately 3 to 4 inches high. The design consists of 6 feet transitions to a 10 feet flat surface.

The purpose of a speed hump is to reduce speeds by vertically deflecting- the wheels and frame of a vehicle. The occupants experience an uncomfortable sensation if the vehicle travels at speeds greater than the design speed of the speed hump.

#### ADVANTAGES:

- Reduces vehicle speed. More effective if used in a series at 300' to 500' spacing or in conjunction with other traffic calming measures.
- Can reduce vehicular volumes.
- No restrictions to on-street parking.
- Requires minimum maintenance.

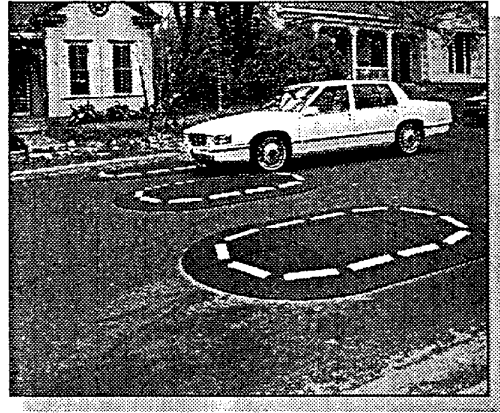
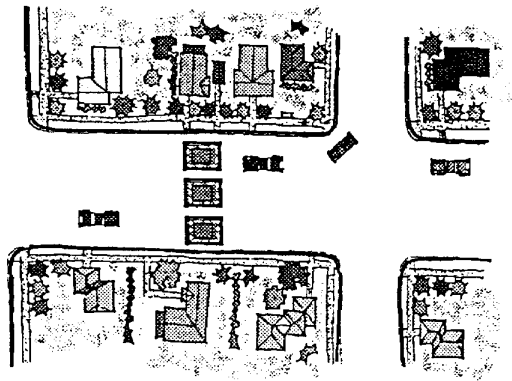
#### DISADVANTAGES:

- May divert traffic to parallel streets that do not have traffic calming measures.
- Increases emergency response times.
- Required signage may be considered unsightly.

#### COST:

- Low

## **SPEED CUSHIONS**



### **DESCRIPTION:**

Speed cushions consist of raised pavement of pavement raised 3-4 inches in height. The length of the cushion is a minimum of 9 feet. The spaces between the cushions allow wider emergency vehicles to partially straddle the measure.

### **ADVANTAGES:**

- Reduces vehicle speed. More effective if used in a series at 300' to 500' spacing or in conjunction with other traffic calming measures.
- Can reduce vehicular volumes.
- No restrictions to on-street parking.
- Requires minimum maintenance.
- Less impact to emergency response times than speed humps.

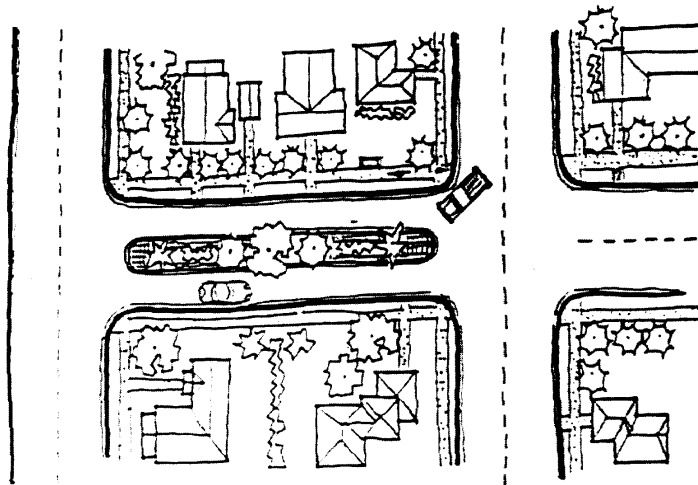
### **DISADVANTAGES:**

- May divert traffic to parallel streets that do not have traffic calming measures.
- Increases emergency response times.

### **COST:**

- Moderate/ Expensive

## RAISED CENTER MEDIAN



### DESCRIPTION:

Raised center medians are raised islands constructed in a street. They are typically landscaped with ground cover, bushes and trees or paved with decorative pavers. Raised center medians create narrowed lanes and encourage motorist to slow through the narrow section.

Raised center medians may be used in conjunction with speed cushions.

### ADVANTAGES:

- Reduces lane width and vehicular speed.
- Provides aesthetic visual break up on long straight residential streets.
- Used as a neighborhood entry, provides visual que to motorists that they are entering a neighborhood.
- Can be combined with speed cushions.

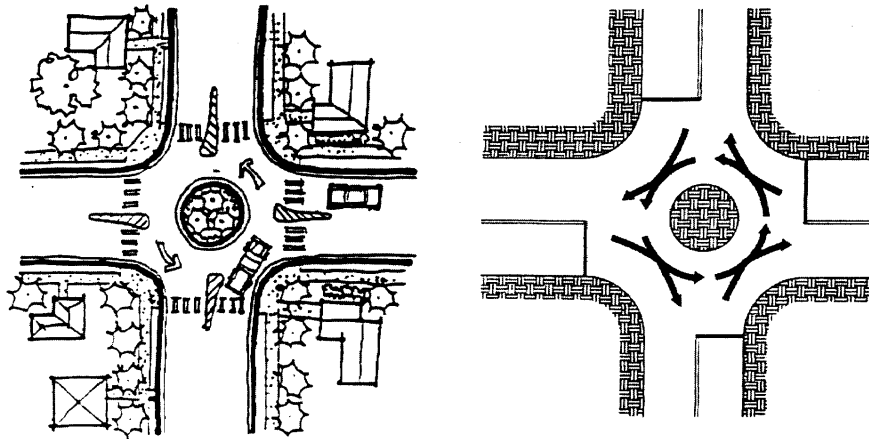
### DISADVANTAGES:

- Curbside parking must be prohibited.
- Maintenance responsibility if landscaped.
- May have little or no impact on cut-through traffic.

### COST:

- High

## TRAFFIC CIRCLE



### DESCRIPTION:

Traffic circles are raised islands constructed at intersections. They are typically landscaped with ground cover, bushes and trees. Traffic circles require drivers to slow to a speed that allows them to comfortably maneuver around them.

Motorists travel in a counter-clockwise direction around the circle. Traffic circles are "yield upon entry" meaning that vehicles in the circle have the right of way and vehicles entering the circle must wait to do so until the path is clear.

### ADVANTAGES:

- Reduces speed at intersection approach.
- Reduces vehicle conflicts at intersection.
- Provides equal access to intersection for all drivers.
- Does not restrict access to residents.
- When landscaped, traffic circles improve the appearance of a street.

### DISADVANTAGES:

- A minimum of 30 feet of curbside parking must be prohibited at each corner of the intersection.
- May not reduce cut-through traffic.
- Will increase emergency response time.
- Can restrict access for trucks and longer school buses, and may require that these vehicles turn left in a clockwise direction (in front of the circle, rather than around the circle).
- Maintenance responsibility, if landscaped.

### OTHER CONSIDERATIONS:

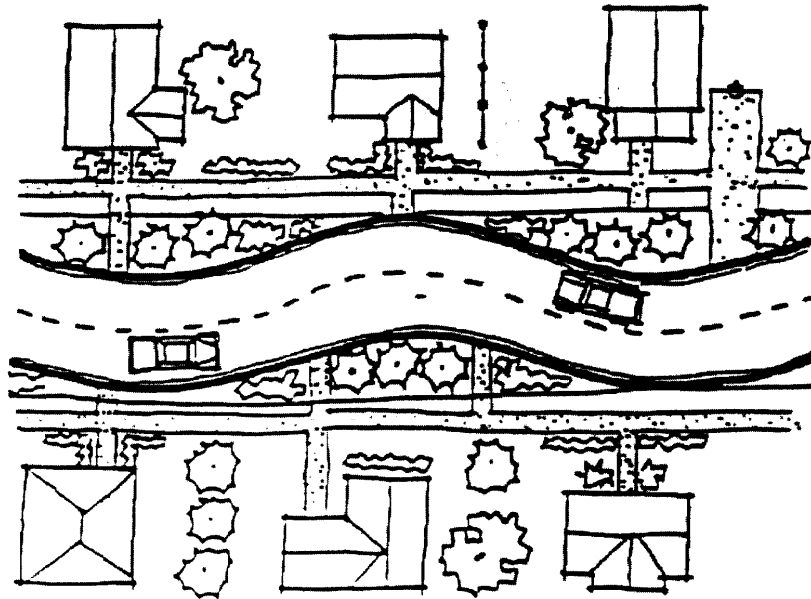
- If well maintained, traffic circles can be very attractive. However, traffic control signs and pavement markings associated with circles decrease aesthetics.
- Most effective in reducing speeds when used in series (two or more consecutive intersections) or in conjunction with other traffic calming measures.
- May require educational campaign and learning period.

### COST:

- High



## CHICANE



### DESCRIPTION:

A chicane is a series of two or more staggered curb extensions on alternating sides of the roadway. They are usually landscaped with ground cover, bushes and trees. Horizontal deflection encourages motorists to slow through chicane.

Small raised island may be added to the design. These islands between or aligned with the curb extensions emphasizes the curvilinear alignment and prevent motorist from crossing the center line

### ADVANTAGES:

- Reduces speed.
- Does not restrict access to residents.
- Minimal impact to emergency vehicles.
- Reduces crossing distance for pedestrians.
- Can be aesthetically pleasing, if landscaped.

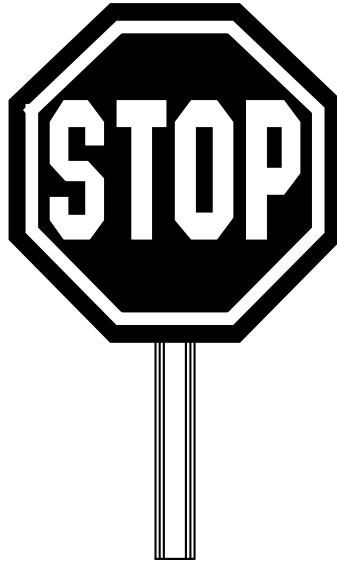
### DISADVANTAGES:

- Curbside parking must be prohibited.
- Maintenance responsibility, if landscaped.
- May have little or no impact on cut-through traffic.

### COST:

- High

## **ALL-WAY STOP SIGNS**



### **DESCRIPTION:**

Stop signs on the "main street" at an intersection where typically only the "side street" would be required to stop

### **ADVANTAGES:**

- Requires through traffic to stop at an intersection.
- Increases opportunities for pedestrians to cross the roadway.
- May discourage cut-through traffic.

### **DISADVANTAGES:**

- May create compliance problems if motorists do not acknowledge the need to stop.
- Mid-block speeds may increase as motorists try to make up for the lost time.
- Safety issues for pedestrians when compliance is poor.
- May increase emergency response time.

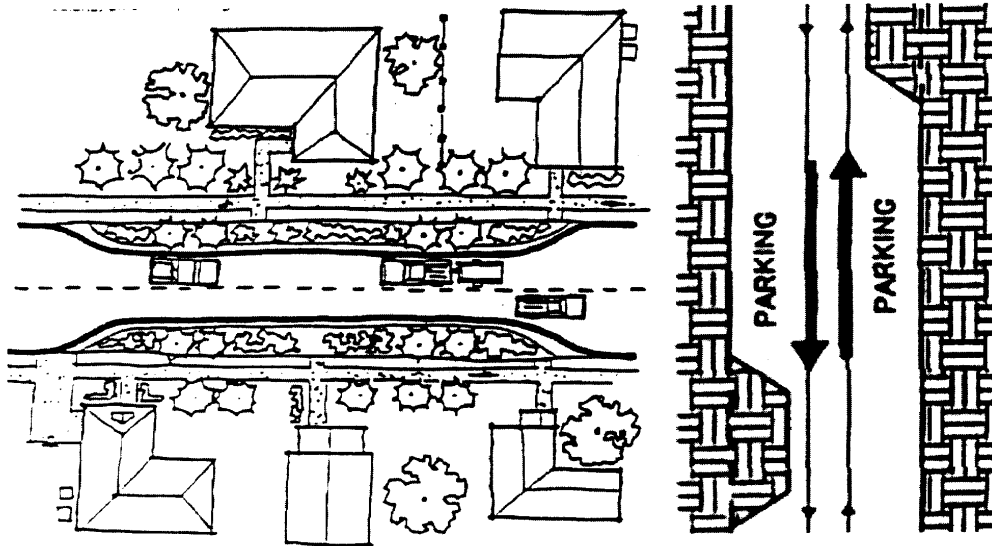
### **OTHER CONSIDERATIONS:**

- All-way stop warrant study must be conducted to justify the all-way stop.
- Special consideration may be given to the intersection of two residential collectors.

### **COST:**

- Low / High (Inexpensive to install, expensive to enforce)

## CHOKERS, CURB EXTENSIONS, OR BULB-OUTS



### DESCRIPTION:

Street physically narrowed to expand sidewalks and landscaped areas; possibly adding medians, on street parking, etc. These measures narrow the pavement by widening the sidewalk area at strategic locations. They provide shorter pedestrian crossing distances and provide protection to the beginning of a parking lane. The driver also senses the roadway narrowing when approaching one of these measures, which can result in speed reduction and a sense that the driver is entering a residential area.

### ADVANTAGES:

- Minor inconvenience to drivers
- Minimal inconveniences to local traffic
- Good for pedestrians due to shorter crossing distance
- Provides space for landscaping
- Slows traffic without seriously affecting emergency response time
- Effective when used in a series
- Single lane narrowing reduces vehicle speed and through traffic

### DISADVANTAGES:

- Double lane narrowing not very effective at reduced speeds or diverting through traffic
- Only partially effective as a visual obstruction
- Unfriendly to cyclists unless designed to accommodate them
- Conflict between opposing drivers arriving simultaneously could create problems

### COST:

- Medium to High

## NEIGHBORHOOD TRAFFIC CALMING PROCESS

